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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/388,567	09/02/1999	HOWARD E. RHODES	303.593US1	4170
21186 7590 02/08/2007 SCHWEGMAN, LUNDBERG, WOESSNER & KLUTH, P.A. P.O. BOX 2938 MINNEAPOLIS, MN 55402			EXAMINER MITCHELL, JAMES M	
			ART UNIT	PAPER NUMBER
			2813	
SHORTENED STATUTORY PERIOD OF RESPONSE		MAIL DATE	DELIVERY MODE	
3 MONTHS		02/08/2007	PAPER	

Please find below and/or attached an Office communication concerning this application or proceeding.

If NO period for reply is specified above, the maximum statutory period will apply and will expire 6 MONTHS from the mailing date of this communication.

Office Action Summary

Application No.

09/388,567

Applicant(s)

RHODES, HOWARD E.

Examiner

James M. Mitchell

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 07 November 2006.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1,3-13,15-17,23-30,48-54,57 and 58 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 23-30,48-54,57 and 58 is/are allowed.
- 6) ☒ Claim(s) 1,3-13 and 15-17 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date 04/17/06.

- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____.
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: _____.

DETAILED ACTION

1. This office action is in response to applicant's amendment filed November 7, 2007. The indicated allowability of claims 11-13 and 15-17 are withdrawn based on the rejection below.

Claim Rejections - 35 USC § 112

2. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

3. Claims 11-13 and 15-17 are rejected under 35 U.S.C. 112, second paragraph, as being incomplete for omitting essential structural cooperative relationships of elements, such omission amounting to a gap between the necessary structural connections. See MPEP § 2172.01. The omitted structural cooperative relationship is the coupling/connection of the first and second trenches¹.

Claim Rejections - 35 USC § 102

4. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

5. Claims 1, 3-8 are rejected under 35 U.S.C. 102(e) as being anticipated by Uzoh (U.S. 6,258,707).

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6. Uzoh (Fig. 16, 17) discloses:

(cl. 1, 4, 7, 8) an interconnect comprising: a trench (not labeled) including: a first barrier layer (118) and a seed layer ("copper seed"; Col. 10, Line 23-34), the trench having a depth and a width, the depth being greater than a critical depth in every part/essentially every part²; and at least one metal layer (145) above the seed layer, wherein the critical depth includes a vertical thickness of the first barrier layer and a vertical thickness of the seed layer and a vertical thickness of a metal layer and a vertical thickness of a second barrier layer (E.g. TiN; Col. 10, Lines 39-41);

(cl. 3) where metal is copper (Col. 10, Lines 17-21);

(cont. cl. 4, 5) wherein the critical width includes twice the sum of the vertical barrier layer, seed and meta layer (e.g. trench more than twice size);

(cl. 6) where the metal layer is planarized³ by CMP (Col. 9, Lines 424-45);

7. With respect to the number of metal layers in claims 7 and 8, see footnote 1.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and

¹ The claim is too broad and can encompass two interconnects structurally unrelated anywhere along a substrate.

² See response to argument section.

³ Note although prior art disclose, the process does not impart patentability where the structure is the same as claimed. "[E]ven though product-by-process claims are limited by and defined by the process, determination of patentability is based on the product itself. The patentability of a product does not depend on its method of production. If the product in the product-by-process claim is the same as or obvious from a product of the prior art, the claim is unpatentable even though the prior product was made by a different process." In re Thorpe, 777 F.2d 695, 698, 227 USPQ 964, 966 (Fed. Cir. 1985)

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the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

8. Claims 9 and 10 are rejected under 35 U.S.C. 103(a) as being unpatentable over by Uzoh (U.S. 6,258,707) in combination with Leiphart (U.S. 6,833,623).

9. Uzoh discloses the elements stated in paragraphs 6 and 7 of this office action, but fails to explicitly show use of its interconnect with first and second logic devices/ and or memory.

10. Leiphart⁴ teaches interconnect for logic and memory (Col. 54, Lines 17-27).

11. It would have been obvious to one of ordinary skill in the art to art to incorporate logic and memory in mix form on a single substrate with the interconnect of Uzoh in order to interconnect components in the semiconductor industry as disclosed by Uzoh.

Allowable Subject Matter

12. Claims 23-30, 48-54, 57 and 58 are allowed.

Response to Arguments

13. Applicant's arguments filed November 7, 2006 have been fully considered but they are not persuasive. Applicant contends that the prior art in Uzoh is overcome, because allegedly it does not show a depth greater than critical depth "in essentially every part of the trench," or a depth greater than critical depth in "every part of the trench." Examiner is unpersuaded.

14. First, because applicant has not explained his rationale in contrast to the rejection made, his arguments amount to mere conjecture that absent extrinsic

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evidence cannot overcome the prima facie case made by examiner. See M.P.E.P §2145 [R-3]. Secondly, assuming that applicant's rationale is based on the step configuration of the trench and that somehow each step represents a depth that is not greater than the critical depth, this to would be found unpersuasive. A depth of the trench is defined as the extent downward to its bottom surface while the steps only define sidewalls of the trench. If sidewalls were used as markers of the trench's depth than any point along the sidewall including the area next to the top horizontal surface (e.g. before entering the recess/trench) would have to be greater than the critical depth, which is impossible based on applicant's definition of the critical depth.

Conclusion

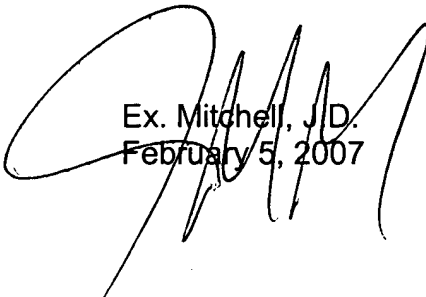
15. Any inquiry concerning this communication or earlier communications from the examiner should be directed to James M. Mitchell whose telephone number is (571) 272-1931. The examiner can normally be reached on M-F 8:00-4:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Carl Whitehead Jr. can be reached on (571) 272-1702. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

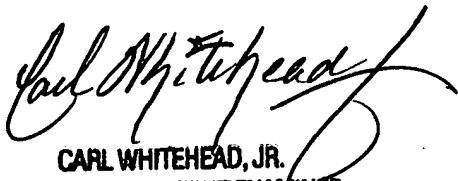
⁴ Fukuda et al (U.S. 6,255,151) further evidences use of interconnect between logic and memory devices.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.



Ex. Mitchell, J.D.
February 5, 2007



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